

Attorney Docket No. US 010229

**REMARKS****I. INTRODUCTION**

Claims 7, 11 and 17 have been amended. Claims 4-11, 13-15, 17 and 19 remain pending in the present application. No new matter has been added. In view of the above amendments and the following remarks, it is respectfully submitted that all of the presently pending claims are allowable.

**II. THE DRAWING OBJECTIONS SHOULD BE WITHDRAWN**

Figure 1 has been objected to and the Examiner has requested the applicants to label the Figure 1 as prior art. Applicants respectfully point out that there is no description in the specification that indicates that the subject matter shown in Figure 1 is prior art. Furthermore, applicants respectfully submit that unless the Applicant explicitly characterizes the figure as prior art, it cannot be considered prior art under 35 USC § 102. The applicants will label the figure as "Related Art" if the Examiner so desires. However, if the Examiner continues to request the label of prior art on the figure, the applicants respectfully request that the Examiner provide support for this position in the form of an affidavit or references. Therefore, it is respectfully requested that this objection be withdrawn.

**III. THE CLAIM OBJECTIONS SHOULD BE WITHDRAWN**

Claims 7 and 17 stand objected to based on formalities. In view of the amendments to the claims, it is respectfully requested that this objection be withdrawn.

**IV. THE 35 U.S.C. § 102 REJECTIONS SHOULD BE WITHDRAWN**

Claims 6-7 and 17 stand rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Pat. No. 5,353,312 to Cupo et al. ("Cupo"). *2/23/06 Office Action*, p. 3..

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Cupo describes a timing recovery circuit that generates a timing signal as a function of the delay provided by an equalizer to one or more predetermined frequency components of its input signal. *Cupo*, Abstract. A pair of analog-to-digital convertors 103 and 104 sample signals from respective channels A and C, and presents output signals to respective equalizers 106 and 107. *Cupo*, Fig. 1. The equalizers 106, 107 receive updated equalizer coefficients based on output from corresponding decision circuits 110 and 111. *Id.* The equalizer components are coupled to the timing recovery circuit. *Cupo* col. 4, lines 23-25.

Claim 7 recites a timing recovery loop in the front end of a digital receiver including N antennae which includes “N forward equalizers, each generating an Nth equalized feedback signal based on the Nth symbol stream at the second sampling rate, respectively” and “*a timing recovery circuit generating the TR control signal based upon a combination of the N equalized feedback signals, wherein the combination is used to generate an output of the digital receiver.*”

Cupo describes using only the equalizer coefficient portions of the output of the equalizers 106, 107. The data portion of the output is later merged to form output data, but is not used by the timing recovery circuit. In contrast, claim 7 recites combining the entire output (i.e., the N equalized feedback signals) of the forward equalizers 16a, 16n and feeding this output into the timing recovery circuit 20". Claim 7 has been amended to clearly distinguish between the feedback signals of the present invention and the equalizer coefficients described by Cupo. Specifically, claim 7 now recites that the combination of the feedback signals is used to “generate an output of the digital receiver.” Cupo only describes using the weighted average of the delay and amplitude responses of the equalizers. *Cupo*, col. 11, lines 20-23. The weighted average is calculated using the equalizer coefficients, and cannot be used to generate an output of the receiver. To create output, Cupo describes a separate step of merging the output of the equalizers 106, 107 using a data merge circuit. *Cupo*, col. 3, lines 60-65. The inputs to the timing recovery circuits described by the present application and Cupo are not

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analogous. Thus, it is respectfully submitted that Cupo neither discloses nor suggests “a timing recovery circuit generating the TR control signal based upon a combination of the N equalized feedback signals, wherein the combination is used to generate an output of the digital receiver,” as recited in claim 7. Because claim 6 depends from, and, therefore includes the limitations of claim 7, it is respectfully submitted that this claim is also allowable.

Claim 17 recites “combining the N equalized feedback signals to produce a combined equalized feedback signal, wherein the combined equalized feedback signal is used to generate an output of the digital receiver” and “producing the TR control signal based on the combined equalized feedback signal.” Thus, it is respectfully submitted that claim 17 is allowable for at least the same reasons stated with reference to claim 7.

#### **V. THE 35 U.S.C. § 103 REJECTIONS SHOULD BE WITHDRAWN**

Claims 8 and 19 stand rejected under 35 U.S.C. § 103(a), as being unpatentable over Cupo in view of the prior art disclosed in Fig. 1 of the present application. *2/23/06 Office Action*, p. 5.

The prior art does not cure the deficiencies of Cupo. Specifically, it is respectfully submitted that the prior art neither discloses or suggests “a timing recovery circuit generating the TR control signal based upon a combination of the N equalized feedback signals, wherein the combination is used to generate an output of the digital receiver,” as recited in claim 7. Because claims 8 and 19 depend from, and, therefore include the limitations of claim 7, it is respectfully submitted that these claims are allowable.

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Claims 11 and 15 stand rejected under 35 U.S.C. § 103(a), as being unpatentable over U.S. Pat. No. 5,703,905 to Langberg. *2/23/06 Office Action*, p. 6.

Langberg describes a receiver system in which a comparator receives input from band edge filters 113a and 113b, and from adaptive equalizers 10a and 10b. The output of the comparator drives a channel selector, which chooses the output of one of the filters 113a, 113b as input to a timing recovery circuit. *Langberg*, col. 4, lines 41-65. Langberg also discloses that data derived frequency and phase signals used to control the timing recovery circuit may be derived using adaptive equalizers instead of band-edge filters. *Langberg*, col. 10, lines 5-10.

Claim 11 recites a timing recovery loop in the front end of a digital receiver including N antennae, comprising “a timing recovery circuit generating the TR control signal based upon a selected one of the N equalized feedback signals, *wherein the selection is controlled based on a combination of the N equalized feedback signals, the combination used to generate an output of the digital receiver.*”

The comparator looks at each output of the equalizers 10a, 10b individually in order to determine which channel has the best signal-to-noise ratio. This is direct opposition to the teachings of the present invention recited in claim 11, which selects from one of N equalized feed back signals based on the combination of the signals. Thus, it is respectfully submitted that Langberg neither discloses nor suggests “wherein the selection is controlled based on a combination of the N equalized feedback signals, the combination used to generate an output of the digital receiver,” as recited in claim 11. Because claim 15 depends from, and, therefore includes the limitations of claim 11, it is respectfully submitted that this claim is also allowable.

Claims 4-5, 9-10 and 13-14 stand rejected under 35 U.S.C. § 103(a), as being unpatentable over Langberg in view of the prior art and *Digital Communications Fundamentals and Applications* by Bernard Sklar. (“the Sklar reference”). *2/23/06 Office Action*, p. 8.

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The deficiencies of Langberg and the prior art have been discussed with reference to claims 7 and 11. It is respectfully submitted that the Sklar reference is insufficient to cure these deficiencies, and that neither Langberg, nor the prior art nor the Sklar reference, either alone or in combination, discloses or suggests "a timing recovery circuit generating the TR control signal based upon a combination of the N equalized feedback signals, wherein the combination is used to generate an output of the digital receiver," as recited in claim 7 and "wherein the selection is controlled based on a combination of the N equalized feedback signals, the combination used to generate an output of the digital receiver," as recited in claim 11. Because claims 4-5 and 9-10, and 13-14 depend from and include the limitations of claims 7 and 11, respectively, it is respectfully submitted that these claims are allowable.

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**CONCLUSION**

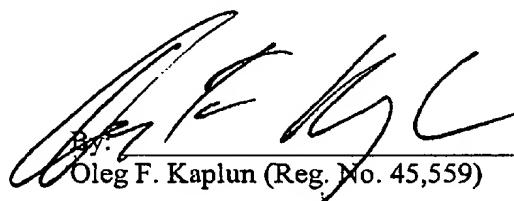
It is therefore respectfully submitted that all of the presently pending claims are allowable. All issues raised by the Examiner having been addressed, an early and favorable action on the merits is earnestly solicited.

Please direct all future correspondence to:

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Respectfully submitted,



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